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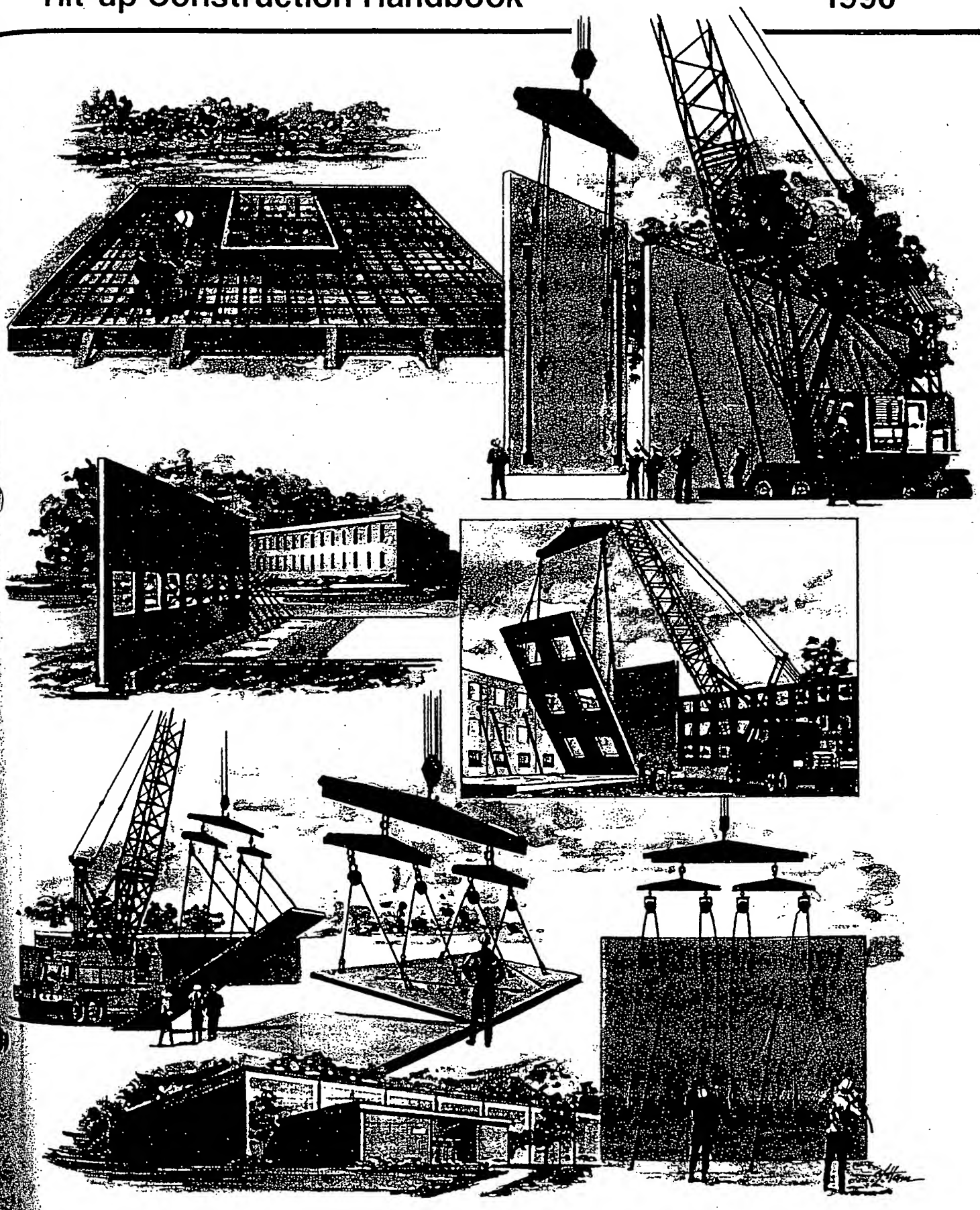
DAYTON SUPERIOR®

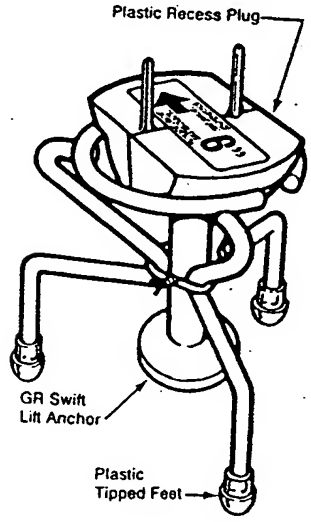
Tilt-up Construction Handbook

1990



T-41 Ground Release Insert

The **GR Swift Lift System** is a unique method of tilting concrete tilt-up wall panels into position and allows the hardware to be easily released from the ground. Ladders are normally not required during the hardware release process which greatly increases worker safety and productivity.



Features of the T-41 Ground Release Insert Are

- **Flexible Plastic Antenna** folds over when screed passes, but springs back to indicate insert location.
- **Plastic Recess Plug** creates a void for attaching the **GR Lifting Hardware** to the insert head. The expendable plastic recess plug is easily removed from hardened concrete.
- **Directional Label** indicates correct panel thickness and direction of plastic recess plug in relation to top and bottom of panel.
- **GR Swift Lift Anchor.** This simple shaped anchor permits rapid hardware attachment and allows smooth rotation of the hardware during the releasing operation.
- **Support Chair** is sized for appropriate panel thickness. Each leg has a plastic tip which protects the wire legs from exposure and potential rust problems. Stainless steel tipped inserts will be supplied for use with panels with foam form liners or exposed aggregate cast face down.
- **GR Swift Lift Inserts** are shipped assembled, ready to use and are sized ⅛" less than panel thickness.

To Order:
Specify: (1) quantity, (2) type, (3) panel thickness, (4) bottom face exposed aggregate or foam form liner thickness.

Example:
150 pcs. T-41 Ground Release Insert for 6" panel and ¾" bottom face aggregate.

T-41 Ground Release Insert Selection Chart

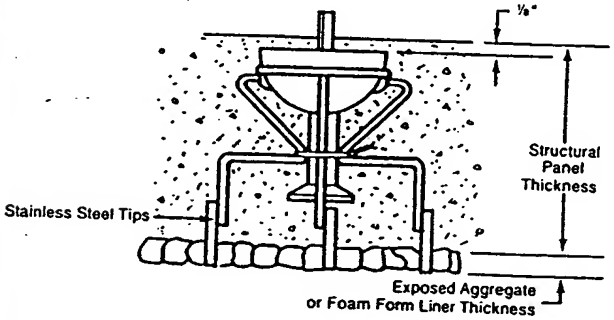
Structural Panel Thickness	5"	5½"	6"	6½"	7"	7½"	8"
GR Swift Lift Anchor Length	3⅜"	3¾"	4"	4¼"	5½"	5½"	5½"
Insert Safe Working Load (lbs.)	8,000	10,000	12,000	12,000	15,000	15,000	15,000

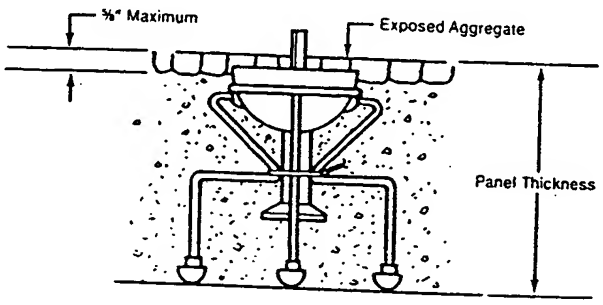
SWL provides a safety factor of approximately 2 to 1 in 2500 psi normal weight concrete.

Danger! Do not use for edge lifting of panels, as insert is not designed for such use. Do not use with top surface seeded exposed aggregate ¾" or larger as aggregate will *pop* out during erection resulting in a reduced insert SWL.

See page 7 for reduction factors that must be applied to insert's SWL when using lightweight concrete.

Exposed Aggregate Panel Inserts

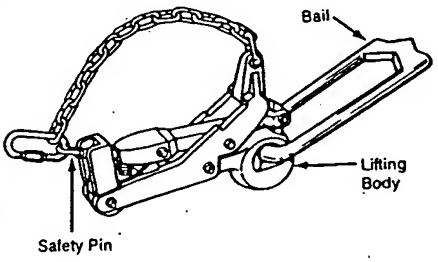




For panels cast with exposed aggregate face up th panel thickness determines the insert height for that panel.

For panels cast with exposed aggregate face down, special stainless steel tipped **T-41 Gr und Release Inserts** are supplied. Both the structural and aggregate thicknesses are required to determine proper insert height.

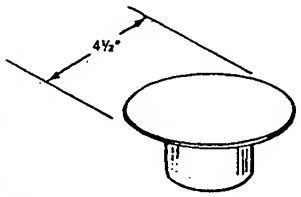
T-43 Ground Release Hardware



U.S. Patents 4,368,914 and 4,700,979
Patented in Canada 1984

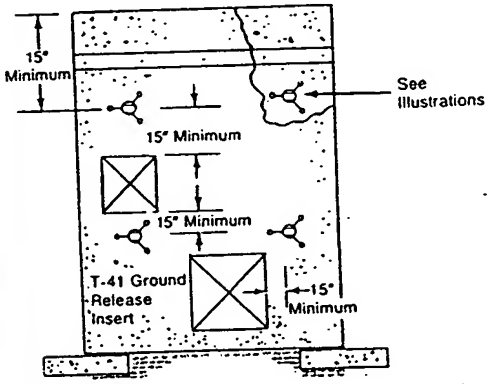
- **Bail** will accept all conventional crane attachments. Unit moves easily as it follows line of action of crane cable.
- **Safety Pin Block** receives ⅜" dia. Safety Pin and prevents accidental release of hardware. Insertion of ⅜" dia. safety pin through Safety Pin Block into hardware body indicates proper attachment of hardware.
- **Safety Pin** must be positioned through Safety Pin Block and into hardware body before tilting sequence begins.
- **Lifting Body** attaches to head of insert. Whenever diagonal loads are applied to the bail, the result is a combination of a compressive load applied to the concrete and a tension load applied to the insert.
- **Release Line** is a ½" hollow braided Polyethylene Cord of sufficient length to reach the ground.
- **SWL** is 15,000 lbs. with an approximate factor of safety of 5 to 1.

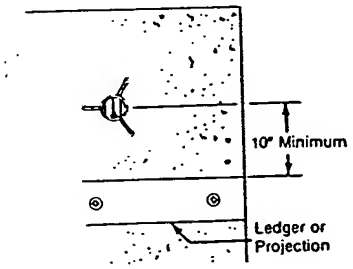
T-45 GR Swift Lift Patch Cap

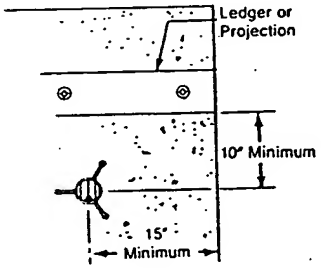


- Cost savings of 60% over conventional grouting methods.
- Fast and easy to install; no more messy grout patching.
- 6" diameter flange covers insert hole.
- Beveled flange edge and friction lock cylinder assures tight, flush fit.
- Available only in *concrete grey* ABS paintable plastic.
- Packaged 20 pcs. per bag.

Minimum Insert Distances







Warning! Inserts must also be properly located in relation to the center of gravity of the panel. This work should be performed under the direction of a registered professional engineer.

Safety Notes

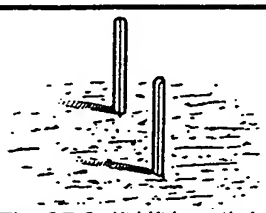
For safe use of the **GR Swift Lift System,** it is necessary for the inserts to be positioned so that the arrows on the directional label point to the top/bottom of the panel. You may also position the directional arrows so they are parallel to the vertical sides of the panel.

Inserts must be properly located in relation to edges, corners, openings and ledgers and at such distances as to permit th development of a full concrete shear cone. These minimum distances are shown in the illustrations above. Embedment of inserts closer to an edg of concrete than the minimums shown will reduce the effective area of the resisting concrete shear cone and thus reduce the insert's safe working load. During placement of concrete, displacement of inserts must be avoided.

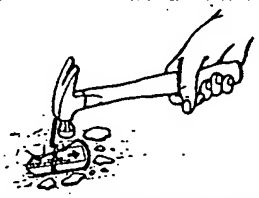
Inserts must be properly embedded in sound concrete and shall be properly wired in plac so that the vertical axis of the insert is perpendicular to the lifting surface.

Do not weld to the **GR Swift Lift Anch** r portion of the **Ground Release Insert.** Welding causes embrittlement and can result in a premature failure.

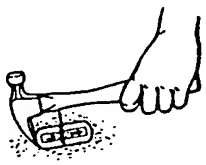
How to Remove the GR Swift Lift Plastic Recess Plug



1. The GR Swift Lift insert's location in the panel is easily found by locating the two antennae which will project through the surface of the concrete.

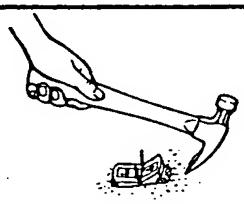


2. Using an ordinary claw hammer tap lightly around the antennae breaking through the thin skin of concrete to expose the insert. Avoid striking the concrete too hard so as not to break through the plastic recess plug.



3. Drive the claws of the hammer down about ⅜", between the end of the recess plug and the concrete.

4. Pry up on the end of the recess plug until one half of it "pops up" to a point where it is about ⅓rd of the way out of the concrete. For the time being leave it as it is and proceed with step #5.

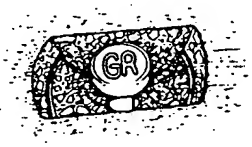


5. Repeat steps #3 and #4 to loosen the opposite half of the recess plug.

6. Grasp both halves of the recess plug between the thumb and finger and squeeze.

7. Both halves of the recess plug should now be easily removed, exposing the insert.

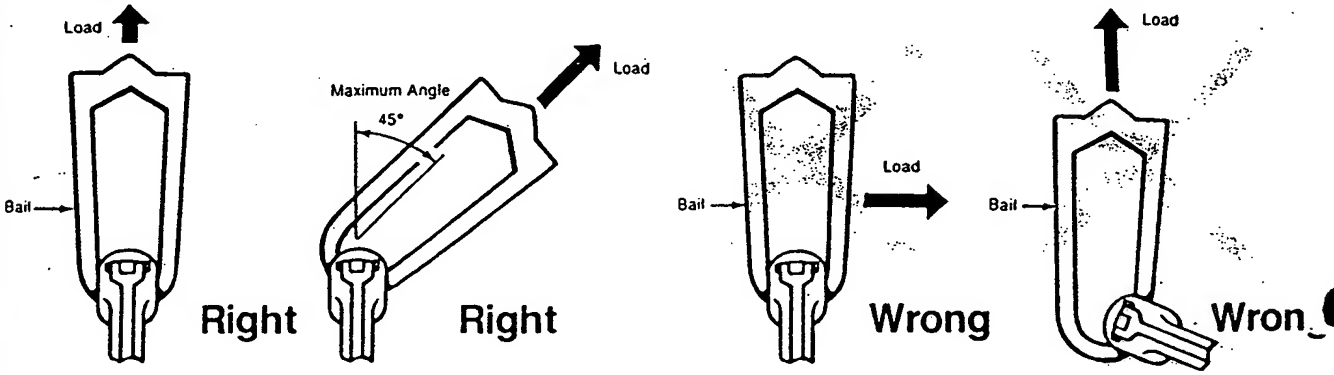
8. If one half of the recess plug should be hard to remove, drive the claws of the hammer as deeply as possible, between the recess plug and the top of the insert, as shown above. Push forward on the hammer with one quick motion. This will remove the recess plug.



9. Use a blower to remove all debris from around the insert and the recess plug. The insert is now ready to receive the lifting hardware.

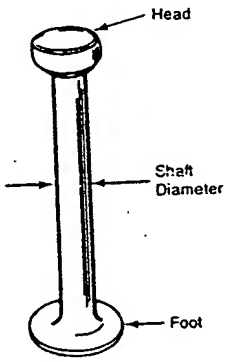
Proper Hardware Usage

Prior to lifting any tilt-up panel, apply an initial load to the crane lines making certain that the hardware is properly aligned and locked onto the anchor head. Do not apply a sideward load to the bail of the hardware.



Danger! Do not modify, weld or alter in any way GR Hardware units. Such actions could lead to premature failure of the hardware.

P-52 Swift Lift Anchor

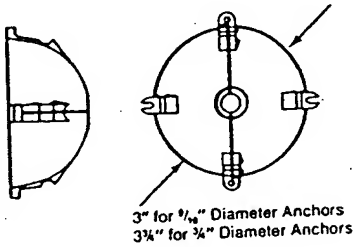


- Available in 9/16" shaft diameter x 6¾" or 11" long.
- Available in ¾" shaft diameter x 9½" or 19" long.
- Hot forged steel head and foot.
- Head provides a spherical seating for engagement of lifting eye.

To Order:
Specify: (1) quantity, (2) type, (3) shaft diameter, (4) length.

Example:
200 pcs. P-52 9/16" diameter x 11" long.

P-54 Disposable Round Recess Plug



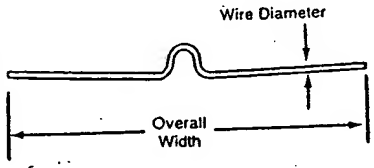
- Available in two sizes—9/16" or ¾" anchor shaft diameter.
- Provides void clearance in concrete for lifting eye.
- Built-in tabs hold and locate preformed shear bar in proper location.
- Re-usable two or three times if carefully removed from concrete.
- Made from high-density-polyethylene—two halfs snap easily around head of **Swift Lift Anchor**.

U.S. Patent No. 4,807,843

To Order:
Specify: (1) quantity, (2) type, (3) anchor shaft diameter.

Example:
350 pcs. P-59 Shear Bar for use with ¾" diameter Swift Lift Anchors.

P-59 Smooth Shear Bar For Swift Lift Anchors



Designed for use with P-54 Disposable Round Recess Plug only.

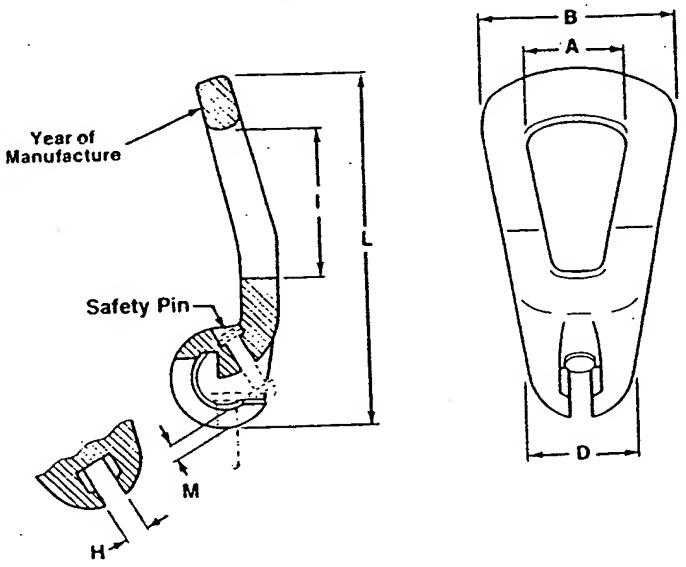
For Use With Anchors Having	Wire Diameter	Overall Width
9/16" Dia. Shafts	.375"	24"
¾" Dia. Shafts	.440"	30"

To Order:
Specify: (1) quantity, (2) type, (3) anchor shaft diameter.

Example:
350 pcs. P-54 Recess Plug for ¾" diameter Swift Lift Anchors.

P-51 SL Lifting Eye

The **P-51 SL Lifting Eye** is a high quality steel casting, hardened and tempered. Its ball shaped lower end fits into the recess formed in the concrete and has a T-shaped slot which engages the spherical head of the anchor. Connection to the anchor head can only be made when the lifting eye is positioned face downwards to the concrete. In the working position, release is impossible. Accidental disengagement is prevented by a gravity-action safety pin which must be raised before the SL Lifting Eye can be removed.



Inspection

While appreciable wear does not normally occur, the general condition and degree of wear should be checked at least every three months. The upper limits of dimension "H" and the lower limits of dimension "M" are shown below. If either of these limits is exceeded, the SL Lifting Eye must be removed from service and destroyed. Regular checks must also ensure that the safety pin is in good condition and moves freely at all times.

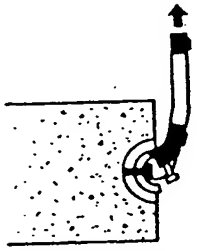
Maintenance

If the safety pin is worn or defective, it must be replaced. Replacement pins can be supplied. No other repairs to the lifting eye are permitted; in particular, welding is *not* permissible.

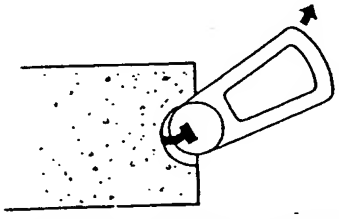
Limiting Dimensions On P-51 SL LIFTING EYE (Inches)			General Information Dimensions of P-51 SL LIFTING EYE (Inches)				
Anchor Shaft Diameter	H Maximum Width	M Minimum Thickness	A	B	D	I	L
9/16"	0.709	0.236	2.64	4.52	2.36	3.74	8.43
3/4"	0.984	0.315	3.00	5.06	2.83	4.96	10.35

How To Use The P-51 SL Lifting Eye

To engage the P-51 SL Lifting Eye onto the head of the SL Anchor, position the P-51 SL Lifting Eye so that the front face is toward the concrete, then raise the SL Lifting Eye into the working position and engage the lifting hook. The safety will drop into position to prevent accidental release of the SL Lifting Eye.



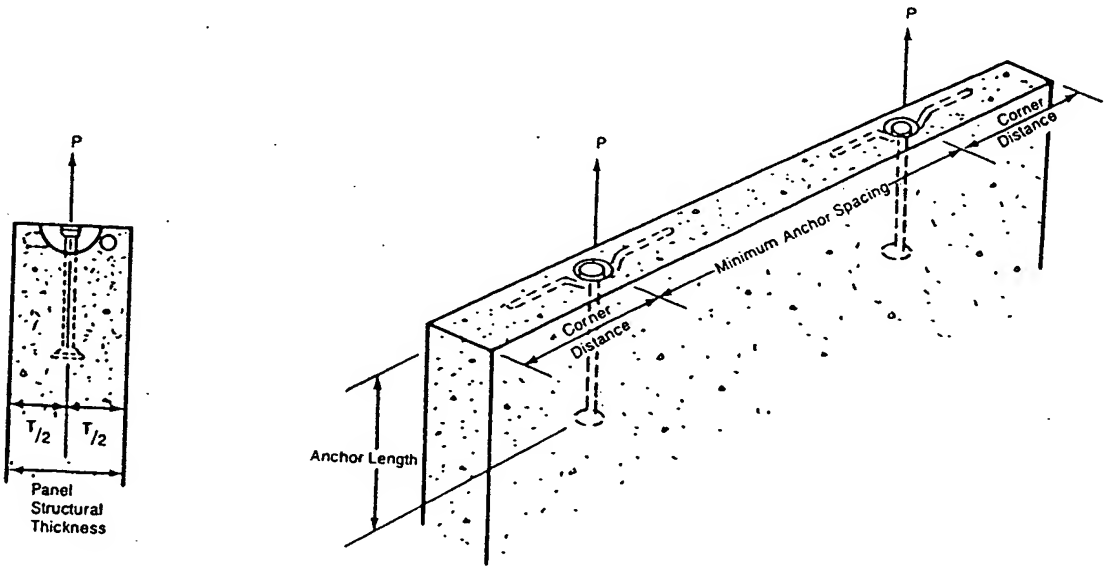
Right



Wrong

Danger! If the **P-51 SL Lifting Eye** is used when its relative position is 90° or 180° from its correct position, the **P-52 SL Anchor** will be overloaded and may result in a premature failure. Do not use the P-51 **SL Lifting Eye** for face lifting of tilt-up panels.

Swift Lift Anchor Tension SWL's



The **Swift Lift System** is a quick connect-disconnect system which allows tilt-up panels to be edge lifted with speed, safety and economy. The system is a non-welded system and also avoids threaded connections, which are time-consuming, subject to thread wear and damage and the further risk of not being fully engaged, with consequent reduction of the safe working load. The reusable **SL Lifting Eye** is free of these disadvantages and by virtue of its quality and heavy duty construction will give years of use.

The efficiency of the system has been proven by years of successful use as well as exhaustive laboratory tests. The components are subjected to regular batch testing during manufacture.

The **SL System** is an ideal method to use when large tilt-up panels must hang plumb for setting.

Shaft Diameter X Anchor Length	Panel Structural Thickness	Tension Safe Working Load Per Anchor (lbs.) Corner Distance 20"	30"	Minimum Anchor Spacing
9/16" Dia. x 6¾" Long	4"	3,500	3,500	4'-0"
	5"	4,400	4,400	4'-0"
	6"	5,300	5,300	4'-0"
	7"	6,100	6,100	4'-0"
	8"	7,000	7,000	4'-0"
9/16" Dia. x 11" Long	4"	5,000	5,600	5'-6"
	5"	6,300	7,000	5'-6"
	6"	7,900	8,000	5'-6"
	7"	8,000	8,000	5'-6"
	8"	8,000	8,000	5'-6"

SWL's provide an approximate 2 to 1 factor of safety in 2,500 psi concrete.
Danger! See page 7 for lightweight concrete SWL reduction factors.

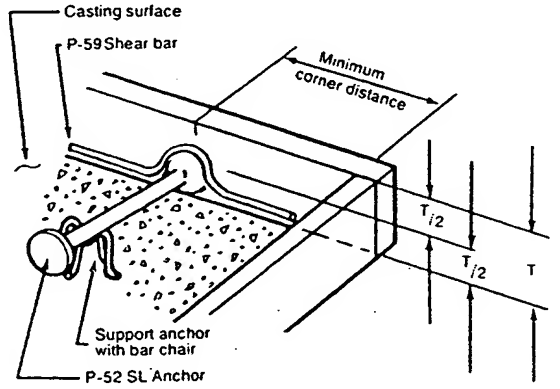
Shaft Diameter X Anchor Length	Panel Structural Thickness	Tension Safe Working Load Per Anchor (lbs.) Corner Distance 24"	30"	Minimum Anchor Spacing
¾" Dia. x 9½" Long	4"	4,700	5,000	5'-0"
	5"	5,900	6,200	5'-0"
	6"	7,000	7,500	5'-0"
	7"	8,200	8,700	5'-0"
	8"	9,200	9,800	5'-0"
¾" Dia. x 14" Long	4"	7,200	7,800	7'-3"
	5"	9,000	9,700	7'-3"
	6"	10,900	11,600	7'-3"
	7"	12,700	13,500	7'-3"
	8"	14,400	15,400	7'-3"

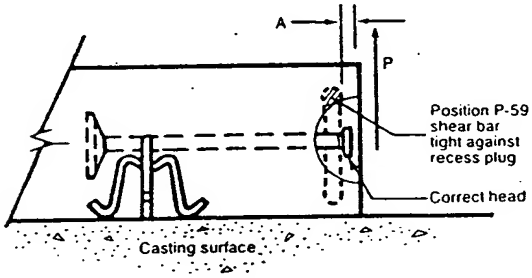
SWL's provide an approximate 2 to 1 factor of safety in 2,500 psi concrete.
Danger! See page 7 for lightweight concrete SWL reduction factors.

Swift Lift Anchor Shear (Edge Lifting) SWL's

The **Swift Lift** System is very useful for raising tilt-up panels from the horizontal casting position to a vertical position. When the **P-52 SL Anchor** is used under this shear loading condition, **special shear bars must be positioned tightly against the recess plug as shown** in the illustrations below to prevent the concrete from spalling. The P-59 Shear Bars must be used to develop the safe shear working loads shown.

To develop the shear capacity of the **P-52 SL Anchor** the minimum spacing between two anchors is two times the corner distance. When raising panels to a vertical position, always check both shear SWL and Tension SWL.





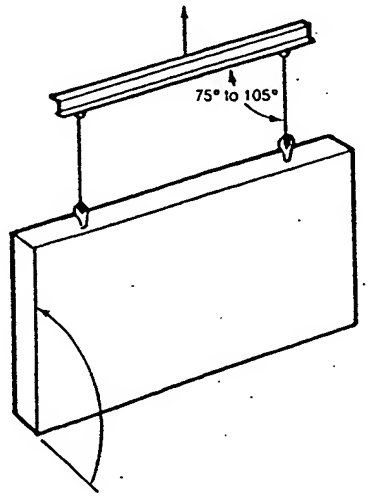
Anchor Shaft Diameter X Anchor Length	Panel Structural Thickness	Minimum Corner Distance	Shear Safe Working Load Per Anchor lbs.
9/16" Diameter X 6¾" or Longer	5"	20"	4,800
	5½"	20"	5,000
	6"	20"	5,200
	7"	20"	5,400
	8"	20"	5,600
¾" Diameter X 9½" or Longer	5½"	24"	4,200
	6"	24"	4,400
	7"	24"	5,200
	8"	24"	5,600

Anchor Shaft Diameter	A
9/16"	½"
¾"	¾"

SWL provides a factor of safety of approximately 2 to 1 in 2500 psi concrete.
Danger! See page 7 for lightweight concrete SWL reduction factors.

Danger! Dayton Superior does not recommend the use of P-52 SL Anchors without shear bars for edge lifting tilt-up panels. Spalling of the concrete above the anchor will result and the anchor could pull out of the concrete at lower than anticipated loads.

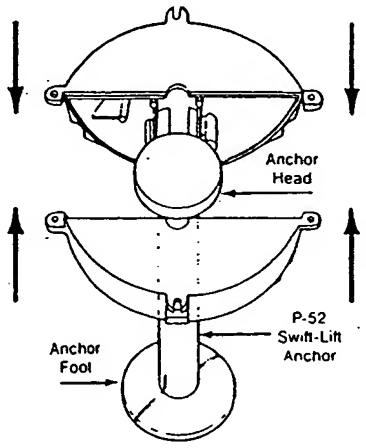
Suggested Rigging Method



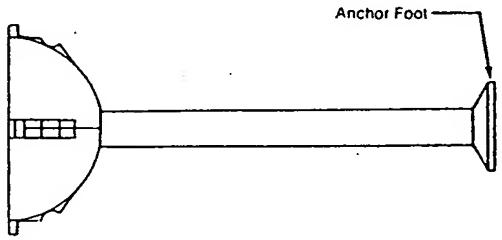
Dayton Superior recommends the use of this type of rigging when using the Swift Lift System to edge lift tilt-up panels. The 4-point rigging would be similar to the 2-point rigging shown.

Warning! The use of angular rigging will apply loads greater than those anticipated and should be avoided.

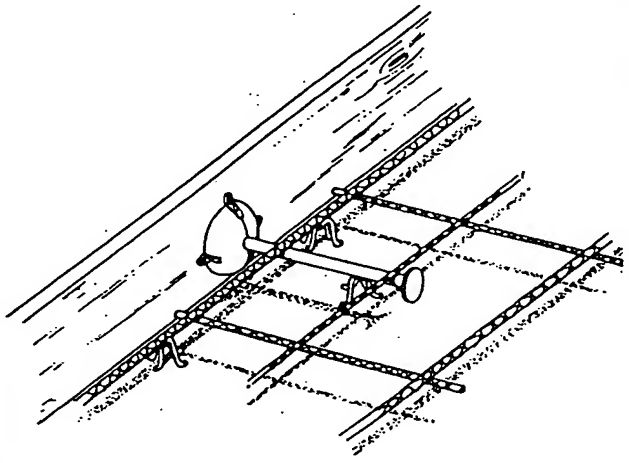
How To Install The Swift Lift Anchor



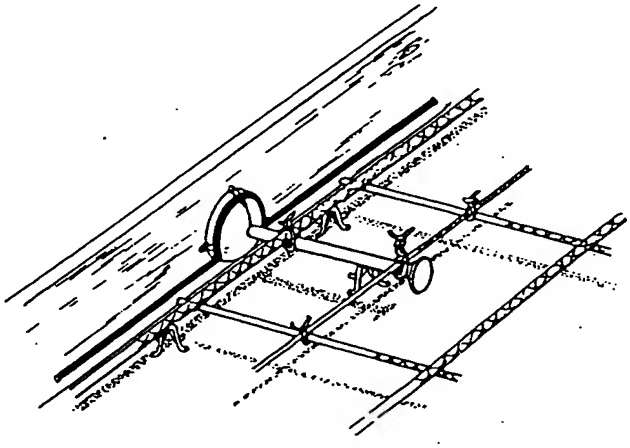
1. Assemble the P-54 recess plug by placing the head of the P-52 swift-lift anchor inside any two halves of the recess plug. Then snap the two halves together. It is very difficult to assemble the unit with the foot of the anchor inside the P-54 recess plug and still get the two halves to close together correctly. If the two halves of the P-54 recess plug do not fit closely together it could be because the anchor is in upside down. In such a case reverse the anchor and try again.



2. A correctly assembled P-54 recess plug and anchor.



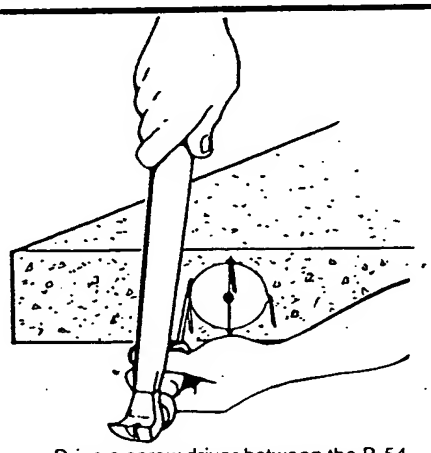
3. Attach the assembled P-54 recess plug and anchor to the formwork in its predetermined location with the recess plug seam in the vertical position. Use common (not double headed) nails in the upper three tabs of the recess plug. The plug and anchor assembly can also be attached to the formwork by using a 2 ton stud and wing-nut if desired. Provide bar supports around the anchor as shown to prevent displacement during the casting process.



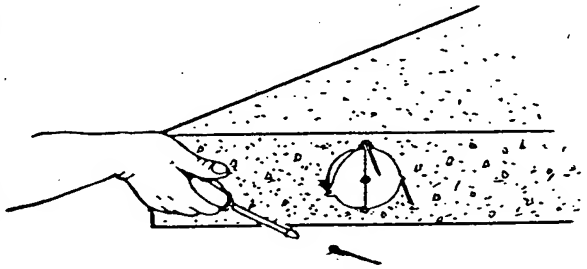
4. Slip the preformed shear bar onto the P-54 recess plug as shown. The receiving tabs of the P-54 recess plug will correctly position the shear bar. Usually additional support wiring is not needed to hold the shear bar in place. However, prudent users will provide an additional wire tie or two to make certain the shear bar will not dislodge during concrete placement. Wire tie the P-52 swift-lift anchor to reinforcing steel as shown.

How To Remove Disposable Plugs

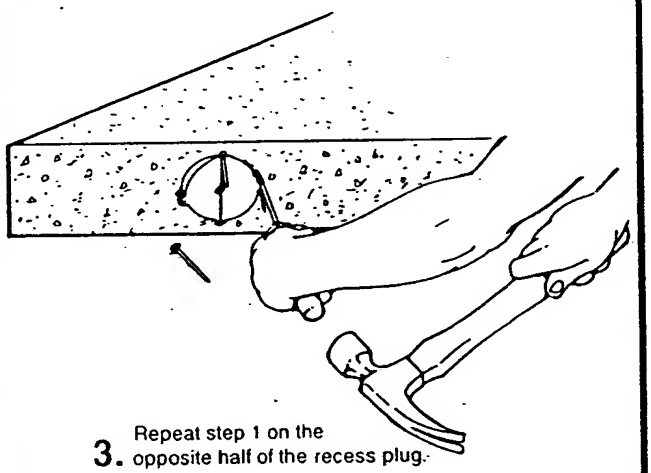
The following procedure shows how easy one can remove these plugs. With proper care, they may b reused two or three times.



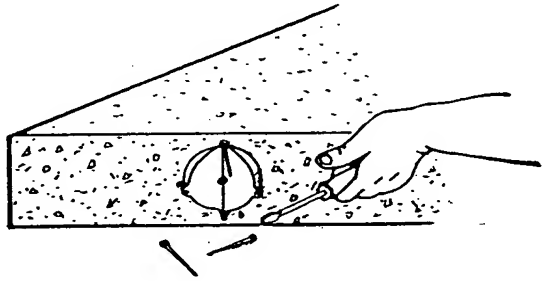
1. Drive a screw driver between the P-54 recess plug and the concrete just above the nailing tab.



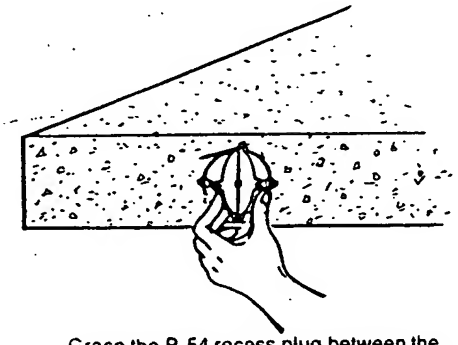
2. Pry outwards away from the plug. This should result in the plug popping out about a third of the way from the concrete.



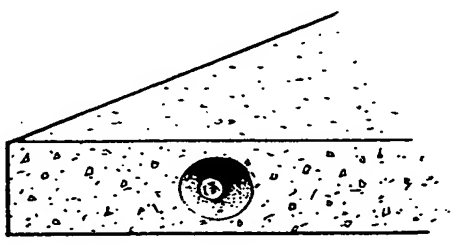
3. Repeat step 1 on the opposite half of the recess plug.



4. Repeat step 2 on the opposite half of the recess plug.



5. Grasp the P-54 recess plug between the thumb and fingers. Squeeze the two halves together.



6. The P-54 recess plug should then be easily removed from the conrete leaving the anchor head exposed and ready for lifting hardware attachment.